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General.

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1. The U.S.S.R. is still largely depending on imported tin despite all efforts to build up a domestic tin industry. Domestic production, which did not become important before the second five-year plan, has been as follows:

Production figures are given in metric tons and include scrap tin.

1935	500	
1936	1,000	
1937	2,000	
1938	3,000	(according to Soviet press reports, 50 percent more than in 1937)
1939	4,500	
1940	7,000	
1941		
1942		approximately
	20,000	(10.5 times the 1937 figure, according to the five-year plan)
1943)	
1944)	(considerable decline because of the war)
1945)	
1946		
1947		
1948		
1949	16,000 to 17,000	
1950	19,000 to 20,000	(2.7 times the 1940 figure, according to the five-year plan)

It is assumed that the 1950 production goal, which includes about 3,000 tons of scrap tin, will largely be reached.

2. Imports had risen continuously before the war. During the war the U.S.S.R. imported such great quantities of tin from the Western Allies, Indo China and the Malay Peninsula that considerable stockpiles are believed to have accumulated while increased requirements were fully covered. Imports declined in 1949, reaching a point lower than the prewar figure. However, this was balanced by an increased

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domestic production. Imports must be expected to increase considerably in 1950 after Chinese production has been restored. In 1950 the annual Chinese output was 11,000 to 12,000 tons. The Soviet tin supply is shown in following chart. Figures are given in metric tons.

	<u>Ore production</u> (including scrap tin)	<u>Imports</u>	<u>Total</u>
1935	500	7,428	7,928
1936	1,000	9,819	10,819
1937	2,000	12,507	14,507
1938	3,000	approx. 12,000	15,000
1939	4,500	12,000	16,500
1940	7,000	-	-
1941	-	-	-
1942	-) over	-
1943	-) 26,000 tons	-
1944	-	-	-
1945	-	-	-
1946	-	-	-
1947	-	-	-
1948	-	-	-
1949	16,000 to 17,000	including 1,000 tons from China 3,000	20,000
1950	19,000 to 20,000	including 5,000 tons from China 7,000	27,000

The present domestic production covers three quarters of the increased requirements, while the prewar domestic production met only one quarter of the total needs.

3. The Soviet tin supply situation is considered to be favorable because of the high domestic production, the favorable prospects of large Chinese tin imports, and the stockpiles which probably exist. The Soviet regime can also cut down civilian consumption at any time in order to fully meet armament requirements and to make stockpiles.

Tin Ore Deposits.

4. A great number of tin deposits have been found in all parts of the U.S.S.R. because of intensive prospecting activities. However, the largest and richest deposits are located in climatically unfavorable parts of the country far from traffic routes. Opening operations will be extremely difficult. The deposits can be divided into the following ten large geographical areas. Among these, the Altai, Chita, Verkhoyansk, Kolyma and the Far East areas are at present the most important, while the deposits in the other areas either have not been fully explored or they are at present not suitable for mining because of their slight productivity.

5. Karelian area has the following deposits:

- Deposits at the Talon Lake, north of Lake Ladoga on the Finnish border. These deposits are spread over a large area but are poor.
- Deposits near Pitsjaranta (61°35'N/31°30'E), on the northeastern shore of Lake Ladoga. The tin occurs near copper and iron ores. There is no mining.

6. The Ukrainian area comprises the following deposits:

- Deposits near Lvov (49°50'N/24°00'E) in Western Ukraine. There has been little prospecting here and no mining.
- Deposits near Nikitovka (48°22'N/38°03'E) in the area around the Don basin. These tin deposits, mixed in with mercury deposits, are possibly mined in connection with the mercury production.

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7. The Caucasus area contains the following:

- a. Deposits near the Bardigon River in the northern Caucasus. These have scarcely been explored, and there is no mining.
- b. Deposits near the Laba River, a tributary of the Kuban River in the northern Caucasus. These deposits, though frequently mentioned, are probably not worth mining. There is no mining at present.
- c. Deposits in the Georgian S.S.R. and in the Azerbaijan S.S.R. Large expeditions were in these areas in 1947 prospecting for tin deposits, among other things. So far the results of these activities are not yet known.

8. The Urals area has the following deposits:

- a. Unmined and presumably insignificant deposits whose location is unknown.
- b. Deposits on the Vairach Island, south of Novaya Zemlya. There has been little prospecting, and there is no mining.

9. Central Asian area, including Kazak S.S.R., Kirgiz S.S.R., and Tadzhik S.S.R., has the following:

- a. Deposits near the Ata-Su River, in Kazak S.S.R. about 300 km directly southwest of Karaganda on the railroad line to Dzhezkazgan. These deposits are found with iron ore. According to the information, mining is under way. The concentrates are allegedly smelted in a smelting works in Krivoshehokovo, Novosibirsk Oblast, built during the war.
- b. Deposits in Ak-Tyus in Kirgiz S.S.R., about 80 km directly southwest of Alma Ata. These deposits also contain lead and zinc. After the opening operations had ended and the dressing problem was solved, a dressing plant was built and put into operation in 1940. This plant allegedly produces tin concentrates in addition to lead and zinc concentrates.
- c. Deposits in Kurgan, Kirgiz S.S.R., about 300 km directly southwest of Frunze. There is no mining there.
- d. Deposits in Kara-Su, Kirgiz S.S.R., about 200 km southwest of Frunze. These deposits are scattered irregularly and the tin occurs in coarse-grained cassiterite (SnO_2), imbedded in "pyrrhotite". The ore is remarkable pure, being completely free of copper, lead, bitumen, and antimony and having only traces of sulphur. Mining was scheduled to start before the war. However, it is not known whether this plan was realized.
- e. Dukenek deposits, somewhere either in Kirgiz S.S.R. or Tadzhik S.S.R.. These are similar to the Kara-Su deposits. Mining had also been planned before the war.
- f. Taryngan deposits, somewhere in either Kirgiz S.S.R. or Tadzhik S.S.R. These are similar to the Kara-Su and Dukenek deposits. Mining was also planned before the war.
- g. Three additional deposits in the region of the Izfara and Libeze Rivers. The individual designations of these deposits are not known. There is no mining.
- h. Takfan deposits in Tadzhik S.S.R., 250 km directly south of Tashkent. The tin occurs along with arsenic, and this complicates smelting. There is no mining.
- i. Deposits in the Pamir Plateau in Tadzhik S.S.R. There are several deposits, but their individual designations are not recorded. They are located in part at heights ranging from 4,000 to 5,000 meters. There is no mining.

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10. The Altai area's tin resources became of greater importance shortly before World War II. The ores occurred especially in the region of the Kalba and Karyn rivers, southeast of Ust-Kamenogorsk. Fifty-one deposits were known before the war, but only nine had been explored to any extent. In addition to tin, some deposits also contained tungsten, tantalum and niobium occurrences. The prospecting center is in Solisatovo. The deposits include the following:
 - a. The Kara Gonin, Mikoyan, Urunkhai, Udaulki, Targyn and Norun deposits, which have been mined by the Kalbaolovo Combine since 1937. There is a dressing plant. The construction of two additional dressing plants was planned for 1949. The daily production capacity of each plant was scheduled to be 150 to 250 tons of ore. The dressing results at the first test installation were not satisfactory because of the inadequate tin content, especially in the Mikoyan ore. All deposits run in large veins. Smelting was scheduled to be done in Kalba.
 - b. Cherdoyak deposits on the Kalba mountain ridge, forming an extension of the Altai deposits in the direction of the Altai mountains in Transbaikalia. Cherdoyak itself is located on the Karshtun River, a tributary of the Irtysh River, north of the Laisan lake.
11. In the Krasnoyarsk area tin is found in various places in gold-washing plants of the Yenisey Z-loto Trust. Washed out just like gold, its industrial significance is slight.
12. The area around Buryat-Mongol A.S.S.R. and Chita Oblast has the following deposits:
 - a. The Chikoi or Chikoko deposits, on the sloping banks of the Ushkanka River, about 200 km directly southwest of Ulan-Ude. The river's sand-banks contain tin, the extraction of which seems to be promising, especially as these deposits are very extensive. It is not known whether these deposits are actually being exploited.
 - b. Dshida deposits somewhere in Buryat-Mongol A.S.S.R. area. The deposits contain cassiterites (SnO_2) in tungsten-gold-sand. Tin is extracted in addition to tungsten and gold.
 - c. Khapcheranga deposits in Chita Oblast, 300 km directly south-southwest of Chita, 200 km directly south of the nearest railroad station in Barasun. Before the war this was considered to be the most important tin deposit in the U.S.S.R. It had an important share in the Soviet tin production despite its unfavorable location for climate and transportation facilities. The only known Soviet estimate of its size, placed at 7,000 tons of tin, dates back to 1933 when the first mines were put into operation. Explorations in the meanwhile have probably found the deposits to be much larger than this. The veins of tin ore are imbedded in layers of sulphides. The average tin content is 1.5 to 2 percent. Mining is done in three large mines 60 meters deep. The ore is treated in a local dressing plant by the flotation process. In 1942 the annual capacity of this installation was 1,200 tons of 40 percent concentrate. Electric power was supplied by eight generators of 250 HP each. Six of them were in operation at a time.
 - d. Considerable tin deposits found 30 km south of Khapcheranga, in Outer Mongolia, in 1933. The U.S.S.R. took a 35-year lease on this area. Within three years the necessary roads were built, and the mines opened. The ore is said to have a particularly high tin content ranging from 2 to 10 percent. There is a dressing plant.
 - e. Slight deposits in Nizhni Ulkhun, in Chita Oblast, about 40 km directly northeast of Khapcheranga on the Onon River. These deposits are probably being mined.
 - f. Slight deposits in Verkhni Ulkhun in Chita Oblast, about 15 km east of Khapcheranga on the Onon River. These deposits are probably being mined.

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- c. Sun-Under deposits in Chita Oblast, somewhere in the vicinity of Shapcheranga. It is doubtful whether these slight deposits are being mined. The tin occurs in cassiterite and scheelite inclusions in quartz veins.
- d. Sokhondo deposits in Chita Oblast, about 20 km west of Shapcheranga. It is a bare mountain massif, 2,500 meters high, and is scarcely accessible for prospecting operations. Numerous tin ore nests are bedded in the sulphide porphyrites. Opening activities started in 1936, but it is doubtful whether the deposits are being mined.
- e. Novo Kuralui deposits in Chita Oblast, about 200 km directly south of Chita on the Inalka River. The mountain range in this area had pegmatite and quartz veins containing rich tin deposits. Mining and dressing of tin ore has been under way since 1936.
- f. Shumilovka deposits somewhere in Chita Oblast. According to press reports of 1943 a tin-tungsten mine is in operation there.
1. Olovyanaya deposits in Chita Oblast, about 200 km directly southeast of Chita on the Onon River. These deposits are north of the Olovyanaya Railroad station on the railroad line to Kharbin. Before the war, this constituted one of the most important deposits in the Far East. The only known Soviet estimate of these deposits states that they contain 3,000 tons of tin; this estimate, however, dates back to 1933 when the first mines were put into operation. The deposits may in the near future have been found to be larger. The first mining operations started in 1932. Mining was suspended during World War I. Numerous short, thin tin veins have been struck, growing richer in tin with increasing depth. A great help to the mining is the abundance of timber and water in this region and the favorable transportation situation. Ore dressing is done in Olovyanaya, smelting of concentrates in Leningrad.
- m. The important Sherlovogorsk deposits in Chita Oblast about 260 km directly southeast of Chita, 16 km from the Khadabulak railroad station on the railroad line to Kharbin. Though the tin content there is only 0.18 percent, the deposits, which are widely scattered, contain tungsten, bismuth and beryllium in addition to tin. Ore and sand production has been under way since 1933. All installations were scheduled to be completed by 1937. The first dressing plant was put into operation in 1936. Its results were not satisfactory, there being a 50 percent loss of tin. A second plant was scheduled to be built during the war. An adequate water supply is difficult to obtain, but coal is available locally. The transportation situation is adequate. Concentrates from these deposits are smelted in Pechorsk.
- n. Smirnov deposits in Chita Oblast, about 130 km directly east of Chita, near Kharbinsk on the Manchurian border. These deposits have lentil-shaped tin inclusions in lead-silver ores imbedded in dolomite. The mine put into operation produces sulphidic ores. The Smirnov and Sherlovogorsk deposits are presumably assigned to the Kharmanolovo Combine which has been considerably expanded since the war. The construction of a large factory processing ore concentrates and of a power plant was known to have been completed in the area of the combine in 1947. The construction of a smelting works was also scheduled in Sherlovogorsk before the war. No information is available on the realization of this project.
13. The Verkhoyansk and Kolyma areas have the following deposits:
- a. I stambula deposits in the Yalutsk Mts., about 150 km directly north of Yalutsk in the Verkhoyansk mountains. These deposits have very rich veins. Opening activities started before the war. A dressing plant was constructed in 1937. The unfavorable climate and the transportation difficulties make mining difficult.
- b. The Khat deposits in Yalutsk Mts., just east of Verkhoyansk near the Yana River. This is the largest tin deposit in the Far East. It has more than 20 individual deposits. The construction of a combine started in 1933. At first it was scheduled to comprise four mines or open-cast pits and two dressing plants.

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with an annual capacity of 20,000 tons each. Two mines were to be added later. According to a 1947 press report, only one mine was to be in operation while additional mines are under construction. Dressing is done in Verkhoyansk. The town of Igarka is presently being expanded for housing a population of 20,000.

- c. Polytekhnicheskoye deposits in Yakutsk A.S.S.R., somewhere near Verkhoyansk. The tin occurs in veins and also in deposits suitable for open-pit production. The area was being explored in 1939, but it is doubtful that it is being mined.
- d. Furavinsk deposits in Yakutsk A.S.S.R. somewhere near Verkhoyansk. These deposits are suitable for open-pit production. Prospecting operations have been under way there since 1939, but it is doubtful that it is being mined.
- e. Additional important deposits at the headwaters of the Dulakha River. The Soviets believe that the deposits in the Verkhoyansk mountains are the world's largest.
- f. Seichen deposit in the Kolyma district, about 370 km directly north of Igarka. This deposit consists of large occurrences of cassiterite veins which are from 0.5 to 0.30 meters thick and are bedded in quartz-tourmaline veins. The tin content is 1.5 to 3 percent. The opening activities started in 1940 under the supervision of the Southwest Gold Administration of Kolyma. Two mines were in operation in 1941, the Lazo mine and the Tatyana Pavlovna mine. In addition to an old experimental dressing plant with a daily capacity of 50 tons, there has been since 1941 a new plant with a daily capacity of 500 tons. The annual output of the dressing plants is 2,500 tons of concentrates, equivalent to an annual output of 1,500 tons of tin. The concentrate is transported to Igarka, and from there it is shipped by water to Vladivostok.
- g. Deposits somewhere in the head quarter region of the Igarka River in the Kolyma area. These comprise large deposits of cassiterite veins imbedded in quartz-tourmaline veins. The thickness of the cassiterite veins range from 0.05 to 0.3 meters. The tin content is 1.5 to 3 percent. The opening activities started in 1939. Of the large number of veins located, only seven were mined in the beginning. The manager of the opening operations, Engineer Grapkin (fnu), estimated the deposits to contain 300,000 to 900,000 tons of cassiterite, covering an area 500 meters long and 3.0 meters deep. The first 120 tons of cassiterite were produced during these opening operations in 1941. A dressing plant has probably been built in the immediate area.
- h. Grotukha deposit in the Kolyma area, about 230 km directly southwest of Seichen. A large number of findings were made in 1938 between the Grotukha River and its tributary, the Igarka River. The deposits were discovered when gold was panned out in the river sand. The sand contained 2 to 2.5 kg of cassiterite per cubic meter. There are scattered cassiterite inclusions in quartz-tourmaline veins. The quartz-tourmaline veins are from 0.2 to 0.3 meters thick. The tin content is 1.5 to 2 percent. The tin ore is produced in underground and open-pit (potholes) mining. In 1942 there were two large dressing plants each with a daily capacity of 50 tons or an annual capacity of 2,000 tons. These plants produced 20 percent tin concentrate, which was transported to Igarka and from there by water to Vladivostok. Smelting was done in Igarka.
- i. Tchet deposit in the Kolyma area, about 200 km east of Grotukha. During the war a new dressing plant was built near Tchet and about 10 km from Igarka. These deposits are similar to those of Grotukha. The tin content is 1.5 percent, sometimes as much as 2 percent. Mining is underground in various places. Dressing is done in two plants which, like the Grotukha plant, are of 50 tons daily capacity each. The concentrate is shipped to Vladivostok via Igarka. Smelting is done in Igarka.
- j. Igarka deposit in the Kolyma mountains 390 km north of Igarka near the Igarka River. These deposits are assigned to the Tirdinsk Mine Administration. Mining is done in mine 3 km west of Igarka. The ore produced is sorted by hand and shipped to the concentration plant (No. 1). In this department the ore of 150 to 200 mm is crushed to 20 mm in the following three stages: coarse grain, medium grain and fine grain ore. It is milled with four rolls the

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- j. In Ege Khai, Yakutsk U.S.S.R., are two plants with a total annual capacity of 40,000 tons.
 - k. In Seirchan in the Kolyma area are two plants with a total daily capacity of 525 tons, corresponding to an annual capacity of 190,000 tons.
 - l. In Elgen in the Kolyma area is a plant with an unknown capacity.
 - m. In Orotukan in the Kolyma area are two installations with a total annual capacity of 44,000 tons.
 - n. In Khet in the Kolyma area are two installations with a total annual capacity of 44,000 tons.
 - o. In Dudogechug in the Kolyma area is a plant with an unknown capacity.
 - p. In Kodgychan in the Kolyma area is a plant with an unknown capacity.
 - q. In Dolshaya Binancha, in Primorski Krai is a plant with an unknown capacity.
 - r. In Stalinsk in the Primorski Krai is a plant with an unknown capacity.
 - s. In Lifudzinsk in the Primorski Krai is a plant with an unknown capacity.
16. The six plants with recorded capacity figures can process an annual total of 530,000 tons of ore. If an annual average of only 40,000 tons capacity is assumed for each of the 13 remaining plants, the annual capacity of all plants together would total 1 million tons of ore. This would correspond to an annual production of 37,500 tons of 40 percent tin concentrate or 15,000 of tin not considering concentration and smelting losses.

Tin Smelting Works.

- 17. Krasny Vyborzhets Plant in Leningrad before the war processed concentrate material with 40 to 50 percent tin, coming mainly from Olovnyannaya. This concentrate, smelted for the plant's rolling mill, was processed in two cylindrical roasting furnaces with a dust recovery installation and in a reverberatory furnace. The plant installations were expanded and renovated after the war. However, details are not available.
- 18. The Podolsk (55°23'N/37°37'E) Plant together with the Leningrad plant handled most of the Soviet prewar tin production. Concentrate material from Khapcheranga, Sherlovogorsk, Orotukan, Khet and Dudogechug was smelted in the Podolsk plant before and during the war. After the smelting works had been reconstructed and expanded in 1935, it had an annual capacity of 5,000 tons of tin. At the beginning only part of it was utilized because of the slight production and the poor quality of concentrates especially of the Khapcheranga concentrate. Later the smelting works was operated at full capacity.
- 19. There was a prewar plan to establish a smelting works for processing the concentrate produced in the Chita district. No information is available on the possible realization of this project. However, according to PW information, a smelting works was built during the war in Sherlovogorsk in the area of the Khinganovo Combine. Details on such an installation are not known.
- 20. According to PW information from January 1942, a tin smelting works was under construction near Krivoshechokovo in Novosibirsk Oblast, 7 km southeast of the Krivoshechokovo railroad station. Begun in 1939, it was scheduled to be put into operation in 1942. This smelting works was designed to process tin concentrate material coming from Temir Tau, Ata-Ju and Kalba. Details on this smelting works are not available.

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21. Information also indicated that a tin smelting works was to be built at the Khibaslono (Altai) Combine. No details are known on the realization of this project.
22. During the war a department for tin smelting was allegedly added to the lead-zinc smelting works in Tetyulhe in Primorski Krai. Concentrate material from Dolzhaya, Sinancha, Stalinsh, and Lifuchinsk was smelted there. Details are not known.

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